BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF THE APPLICATION OF ARTESIAN WATER COMPANY, INC. FOR AUTHORITY TO INCREASE RATES AND CHARGES FOR WATER SERVICE (Filed April 11, 2014)	* * * * *	PSC Docket No. 14- ____________

DIRECT TESTIMONY OF
C. THOMAS deLORIMIER ON BEHALF OF
ARTESIAN WATER COMPANY, INC.

Artesian Water Company, Inc.
664 Churchmans Road
Newark, DE 19702
Telephone: (302) 453-6900
Facsimile: (302) 453-6980
E-mail: artesian@artesianwater.com

MORRIS, NICHOLS, ARSHT & TUNNELL
Michael Houghton
R. Judson Scaggs, Jr.
Karl G. Randall
1201 N. Market Street
P.O. Box 1347
Wilmington, DE 19899-1347
Telephone: (302) 658-9200
Facsimile: (302) 658-3989
E-mail: mhoughton@mnat.com

April 11, 2014

TABLE OF CONTENTS

I. NATURE OF TESTIMONY

Q. Please state your name and place of employment.

A. My name is C. Thomas deLorimier, and I work for Artesian Water Company, Inc. ("AWC" or the "Company"), 664 Churchmans Road, Newark, Delaware.

Q. What is your occupation?

A. I am the Manager of Engineering for AWC and I am principally responsible for engineering and construction for capital projects supporting the Company's operations.

Q. What subjects are addressed in your testimony?

A. My testimony provides a discussion of: (1) the engineering considerations involved in the design of a water system; (2) AWC's water system and the Company's efforts to assure supply to meet the current and future demands of its customers; and (3) the significant non-revenue generating utility plant additions that AWC expects to place into service during the last three quarters of the Test Period (January through September 2014).

My testimony is accompanied by a number of exhibits. The analyses presented in my testimony and the accompanying exhibits were conducted either by me or under my direct supervision.

II. EDUCATIONAL AND PROFESSIONAL BACKGROUND

Q. Please describe your educational and professional background.

A. I received a Bachelor of Engineering degree from Virginia Polytechnic Institute and State University, majoring in Civil Engineering, in 1976. I am currently licensed as a Professional Engineer in six states: Delaware 5947, Maryland 20715, Pennsylvania PE-048683-R, New Jersey GE-38810, Virginia 041597, and Ohio 70550.

I began my professional career as a Civil Engineer with the Delaware Department of Transportation in July 1976. In that position, my primary responsibilities were the development and implementation of public transportation policy and capital improvement programs focused on the Public Bus System in and around the City of Wilmington, Delaware.

In October 1984, I accepted a position with the Delaware Administration for Regional Transit (DART) in Wilmington, Delaware, as the Support Service Manager. My principal responsibilities were directing and managing the facility operations and new construction for the DART bus company. I was responsible for the preparation and bidding of technical specifications for all capital assets and also managing the following programs: safety program, revenue collection system, environmental compliance issues, daily operation of the capital facilities, and the reduction of operating costs for all of DART's capital facilities.

In 1986, I became the Deputy Director of Public Works for Cecil County, Maryland. For eight years, I managed the staff of 100 employees in three divisions that maintained eight water and wastewater treatment plants, 500 miles of roads, 99 bridges, and a central county landfill. Through the engineering department, I provided daily operational management and engineering to the assets of these three divisions.

In 1994, I joined the staff of Tatman & Lee Associates, which eventually became the URS Corporation. As a Senior Project Manager, I specialized in the design and operation of conventional and alternative sanitary sewer systems, wastewater treatment plants, water distribution systems, and water treatment plants. My responsibilities encompassed consulting, engineering, project management, planning, design, preparation of permit and funding applications, construction management, construction inspection, operation of water and wastewater facilities, and operational and maintenance assistance to numerous municipalities and counties throughout Pennsylvania, Maryland, and Delaware.

In 2000, I was promoted to the Office Manager position of the URS Wilmington office. For ten years I managed environmental, civil and municipal engineers as well as planners in the Wilmington, Delaware area. During that time, we opened a branch office in southern Delaware and expanded services to over a dozen new municipalities, primarily in connection with the planning and designing of both water and wastewater treatment facilities. While at URS from 2009 to 2013, I served as the National Client Account Manager to the American Water Company and other private water utilities in the region. Nationally, I assisted URS offices in marketing, managing, and executing projects specifically focused on the private water utility business. This position allowed me to visit private water offices throughout the country and assist URS offices in providing a full range of services to several national private water clients.

In 2011, I was promoted to the Mid-Atlantic Water/Wastewater Business Line Leader for the region surrounding Delaware. I assisted 12 URS offices in six states with water and wastewater pursuits, key hires, and other tasks to grow the Water/Wastewater business within the region.

In September 2013, I was hired as AWC's Manager of Engineering. My principal responsibilities are to review, quantify, and document the Company's water supply capabilities and to undertake hydraulic studies and make recommendations for system improvements. I have been involved in the design and construction of numerous improvements. Additionally, I have been involved with regulatory reporting, project permitting, addressing water quality issues, including hydraulic improvements to improve quality and availability, as well as water treatment studies.

Q. **How has your previous experience with Municipal, County, and State agencies been helpful in your current position?**

A. I have worked either directly or indirectly for the State of Delaware and Cecil County Government over the past thirty-seven years and was either involved with and/or responsible for operations that provided essential public services on a 24/7 basis. This experience has given me an excellent opportunity to understand water systems and how to support operations at AWC. As Cecil County's Deputy Director of Public Works from 1986-1994, I was responsible for the four public water systems that are now the water systems owned by the Company. These experiences have prepared me well for my new position at the Company.

Q. **How has your experience as a consultant designing water and wastewater projects been helpful in your current position?**

A. During my time as a consultant, I designed numerous water and wastewater treatment plants that provided services to populations in Delaware, Maryland, and Pennsylvania. Most of those systems were comparable in size and complexity to those that are operated by AWC.

Q. **Are you active in any professional organizations?**

A. Yes. I am a Registered Professional Engineer in the State of Delaware and five other states in the region. I am a member of several professional organizations, including the Delaware Association of Professional Engineers, the American Water Works

Association, the American Public Works Association, and the American Council of Engineering Companies. I am currently serving as the President of the Delaware Chapter of the American Public Works Association.

Q. Have you previously testified on water and wastewater related issues?

A. I have testified on a number of water and wastewater related issues before civil courts and planning boards as an expert witness. I have served on a number of advisory committees and panels. I have also represented clients in connection with construction permits before the Delaware River Basin Commission and the Susquehanna River Basin Commission.

III. WATER SYSTEM DESIGN

Q. Why is it vital to have a public water system rather than to allow our citizens to maintain their own private wells?

A. Having a public water system is the most cost-efficient way to provide high-quality water, to ensure a reliable water supply, and to deliver dependable water service to the public. Individual, private wells are more susceptible to contamination and salt intrusion. There is no systematic quality control or monitoring available for private wells. Finally, water supply from private wells cannot assure our State's population adequate fire protection, nor can that supply be considered reliable during a power outage. By way of example, AWC customers continued to have reliable water service during Hurricane Isabel in 2003 when power outages lasted several days, while those homeowners on private wells had no water service.

Q. To help frame the development and features of the projects for which AWC seeks recovery in rates, please describe the overall engineering considerations involved in the design of a system to provide water to customers.

A. There are four basic components to a water system: (1) source of supply; (2) treatment; (3) storage; and (4) distribution. An engineer must consider several factors when designing a water system. First and foremost, the engineer must consider both the current and the foreseeable future level of need for water. Then, using the estimated current and future need for water as a starting point, the various possible alternative solutions that could be implemented to meet that need must be evaluated. The evaluation of possible alternative solutions itself requires the consideration of a number of factors.

Q. What are those factors?

A. The evaluation of possible alternative solutions includes assessing the capacity of any given solution to supply the needed quantity and quality of water. The evaluation also requires consideration of the level of complexity of the solution. In addition, the safety of both the end-users and those who are in daily contact with the equipment associated with the solution must be considered, along with the reliability of the solution. Finally, the costs associated with the solution must be evaluated. In each case, the goal is to select the most cost-effective solution without jeopardizing the ability to meet anticipated demand. These factors and how each relates to the four basic components of a water system are discussed in greater detail in **CTD Exhibit 1**.

Q. From an engineering standpoint, do you approach designing the components of a water system for new customers on a customer-by-customer basis?

A. No. If we took a customer-by-customer approach, everyone would be getting their water from individual wells. As I stated earlier, we consider both the current and the foreseeable future level of need for water over time. In other words, we consider how many new customers need water immediately as well as the rate at which new customers will be added to the system in the future. We then design a cost-efficient system to match those needs.

Regulatory requirements may add to the complexity of installing a cost-effective solution. For example, there is currently a requirement that a project included in rate base must be 75% used and useful within three years. That may require the Company to install interim facilities which, although they may meet the initial needs of a community, are undersized to meet the community's ultimate needs. It may, therefore, be necessary to replace equipment or facilities with facilities of greater capacity long before the original equipment's useful life is realized.

IV. AWC'S WATER SYSTEM

A. Overview

Q. Provide an overview of AWC's water system.

A. The Company's water system extends over 273 square miles in Delaware, serving about 80,000 customers statewide. AWC's water systems can be considered separately by Delaware county - New Castle County, Kent County, and Sussex County.

In New Castle County AWC has one large integrated system serving over 71,000 customers (the "Main System"), plus five individual systems located southern New Castle County. Before 2004, when the Company directionally drilled a pipeline under the C&D canal, there were nine separate systems in southern New Castle County in addition to the Main System in northern New Castle County. Since that time, we have integrated four southern New Castle County Systems into the Main System. Our Main System now extends from the Pennsylvania border to Townsend, Delaware. In terms of reliability, integrated systems provide multiple sources of supply for back-up purposes.

AWC has six individual water systems in Kent County and five individual water systems in Sussex County. Each water system is separately described in the sections below.

B. New Castle County

Q. Describe the Company's water systems in New Castle County.

A. AWC's water service territory extends over 125 square miles in New Castle County as shown in **CTD Exhibit 2A** and is broken into the following six water systems: New Castle County Main System; Delaware Correctional Center ("DCC"); Commodore Estates; Augustine Creek; Bayview; and Odessa Woods. Each system will be described in detail below. The Company currently serves over 71,300 customers in New Castle County.

Q. Describe the New Castle County Main System.

A. The New Castle County Main System is divided into ten hydraulic service levels categorized by elevation changes. It is considered to be one system as water is readily transferrable between service levels. The Company serves over 71,000 metered customers in this portion of its service territory.

Q. Describe each of the hydraulic service levels in New Castle County?

A. The ten hydraulic service levels identified by their geographic location as shown in **CTD Exhibit 2A** are: 1 – Route 40; 1A – Maryland Connection; 2 – Kirkwood Highway; 3PC – Pike Creek; 3SP – Sherwood Park; 3LP – Lancaster Pike; 4 – Hockessin; 5PM – Penn Manor; 5OWR – Old Wilmington Road; and 10 – Southern New Castle County.

Q. How is water readily transferred between the hydraulic service levels in New Castle County?

A. Water is readily transferred through a series of booster pumping stations and pressure reducing valves ("PRVs"). There are eleven booster stations in New Castle County, each with back-up power to transfer water from lower to higher elevation hydraulic service levels. There are fifteen PRVs in New Castle County that transfer water from higher to lower elevation hydraulic service levels. Both the PRVs and booster stations are further described in **CTD Exhibit 3**.

Q. What are the sources of supply for AWC's New Castle County Main System?

A. There are a total of 71 wells in 26 well fields in the New Castle County Main System. These wells are permitted by the Department of Natural Resources and Environmental Control ("DNREC"). They are allocated for a total withdrawal of approximately 32 million gallons per day ("MGD") at the individual allocation limits specified in **CTD Exhibit 4**.

Q. Describe the use of the Aquifer and Storage Recovery Well in Service Level 1.

A. AWC has one Aquifer and Storage Recovery ("ASR") well identified as the Llangollen ASR well. ASR involves the use of a well to recharge the aquifer during the winter months when excess water supply is available, then pumping from the same well to recover the recharged water during the summer to meet peak demands. The data presented in the table below summarizes the cycle of storage and recovery in the Llangollen ASR well over the past 8 years beginning with the 130 million gallons ("MG") in storage in 2006.

CURRENT CYCLE/YEAR	2006	2007	2008	2009	2010	2011	2012	2013
AMOUNT INJECTED DURING CURRENT CYCLE (MG)		97	89	90	102	95	63	54
TOTAL STORAGE AVAILABLE FOR USE (MG)	130	135	132	167	163	182	133	80
AMOUNT RECOVERED DURING CURRENT CYCLE (MG)	92	92	55	106	76	112	107	63
TOTAL REMAINING IN STORAGE (MG)	38	43	77	61	87	70	26	17

Based on data from 2006 to 2013, there is as average of 52 MG residual storage from the previous year at the start of every cycle. An additional 90 to 100 MG is typically injected into the ASR each cycle leaving approximately 140 MG available for use. An average of 85 to 90 MG is recovered each cycle. Due to well Llangollen G-3 being taken out of service during 2013 for high levels of 1,4 dioxane, less water was injected into the ASR well that year.

Q. What interconnections are in New Castle County?

A. AWC has a total of eighteen interconnections in New Castle County, of which thirteen interconnections are in Northern New Castle County as further described in **CTD Exhibit 5**. Average day capacity is the amount of water that is available through each of these interconnections under normal demand conditions. Maximum monthly capacity reflects the hydraulic capacity of the interconnection to flow water. Although a number of these interconnections provide for the transfer of water in either direction (either to AWC from a neighboring utility, or from AWC to the neighboring utility), the Company can purchase nearly 13 MGD during normal conditions and about 14 MGD during peak demand conditions in northern New Castle County. The interconnections, however, may be limited by the supply available to the provider during drought periods.

AWC has contractual obligations to purchase water through one interconnection with the Chester Water Authority ("CWA"), in Service Level 5PM. This interconnection has been maintained since 1992. The agreement currently obligates the CWA to provide up to 6.0 MGD to AWC. In return, the Company must purchase a minimum of 2.0 MGD on any given day and an average of 3.0 MGD on a yearly basis. The agreement allows AWC to purchase greater quantities of water as needed. AWC is contractually required to purchase a minimum of 3.0 MGD through this interconnection on an annual basis through the year 2021.

In 1998, AWC entered into an agreement with the Town of Middletown in southern New Castle County whereby the Company would provide water service to all developments outside of the incorporated limits of the Town as it existed in 1997. AWC transfers water to Middletown through four interconnections located on Industrial Drive, Route 299, Route 301, and Bunker Hill Road. AWC transfers water from Middletown to customers within the Main System through a fifth interconnection at Green Giant Road. These interconnections enable the Company to freely move water to the Town to meet the current growth and to transfer water through the Town to meet AWC's needs as conditions warrant.

Q. What type of treatment is required in New Castle County?

A. Sodium hydroxide (caustic) or calcium oxide (lime) for pH adjustment, sodium hypochlorite or chlorine gas for disinfection, a corrosion inhibitor and fluoride are used at most treatment facilities in New Castle County. Aeration is used at many of the facilities to reduce the quantity of chemicals required for pH adjustment. Additional treatment such as filtration for the removal of iron or radium, and carbon contactors for the removal of polychloroethylene ("PCE"), tetrachloroethylene ("TCE"), and bis(2-chloroethyl)ether ("BCEE"), are used at some of the facilities as further described in **CTD Exhibit 6.**

Q. **What storage is in the New Castle County Main System?**

A. There are twenty-three storage tanks, with approximately 38 MG of capacity in the New Castle County Main System as further described in **CTD Exhibit** 7.

Q. **Describe the Distribution System in the New Castle County Main System.**

A. There are approximately 993 miles of water main and 4,440 fire hydrants in the New Castle County Main System. Pipe material is primarily ductile iron ("DIP") with some cast iron ("CI"), galvanized steel ("GALV"), copper, polyvinylchloride ("PVC"), polyethylene ("PE"), asbestos cement ("AC"), steel and high density polyethylene ("HDPE"). Pipe sizes range from 1-inch to 24-inches in diameter.

Q. **Describe the individual water systems in New Castle County.**

A. As previously mentioned. AWC has five individual water systems in New Castle County: Delaware Correctional Center ("DCC"), Bayview, Commodore Estates, Augustine Creek, and Odessa Woods. These systems, other than the DCC, each provide service to a single residential community. **CTD Exhibit 8** describes each system in terms of number of customers, distribution system, number of wells, treatment required, storage on-site, and availability of back-up power.

C. <u>Kent County</u>

Q. **Describe AWC's water systems in Kent County.**

A. In 1997, AWC began providing water service to several communities in Kent County. Artesian's Kent County service territory is shown in **CTD Exhibit 2B**.

In Kent County, the Company is dependent entirely upon groundwater for supply which is supplied from nineteen wells with a total capacity of approximately 3.3 MGD. There are six storage tanks with total system storage of approximately 2 MG. The water distribution system consists of more than 72 miles of pipeline ranging from 2-inches to 16-inches in diameter and more than 350 hydrants.

AWC currently serves approximately 2,800 customers in Kent County in two regional systems (Church Creek and Windsong) and four individual systems (Deer Meadows, Paradise Estates, Big Oak, and Weatherstone Crossing). Each system will be described in detail below.

Q. Describe the Church Creek water system.

A. The Church Creek water system is located in the center of Kent County extending from the area west of Frederica north to Magnolia along Barretts Chapel Road. It serves the residential developments of Barkers Landing, Church Creek, Chestnut Ridge, Irish Hill, Doe Run, Quail Landing, Riverview Estates, and Riverside as well as commercial development in these areas. There are approximately 1,600 customers on this system, which has eight wells six treatment facilities (Barkers Landing, Riverview, Hunters Ridge, Church Creek, Jonathans Landing and Riverside), and three storage tanks as further described below.

Q. What is the source of supply in the Church Creek system?

A. There are eight wells located in six wellfields in the Church Creek system as further specified in the table below. The total withdrawal allocated for the Church Creek water system is 1.1 MGD.

WELLFIELD	NUMBER OF WELLS	DNREC ALLOCATED WITHDRAW (GPD)
Barkers Landing	2	400,000
Riverview	1	108,000
Hunters Ridge	1	108,000
Church Creek	2	468,000
Jonathans Landing	1	Less than 50,000
Riverside	1	93,000

Q. What treatment is required in the Church Creek system?

A. Treatment varies at each of the facilities in the Church Creek water system, as shown in the table below.

FACILITY	DISINFECTION	IRON REMOVAL FILTERS	CORROSION INHIBITOR	BACKUP POWER
Barkers Landing	Hypochlorite		Yes	Yes
Riverview	Hypochlorite	Yes*	Yes	Yes
Hunters Ridge	Hypochlorite		Yes	Yes
Church Creek	Hypochlorite		Yes	
Jonathans Landing	Hypochlorite		Yes	
Riverside	Hypochlorite	Yes*	Yes	

*Potassium Permanganate added

Q. What storage is on the Church Creek system?

A. Storage for the Church Creek water system is provided by a 1 million gallon elevated storage tank (Blessings Tank), located south of Magnolia along Barretts Chapel Road, a 40,000 gallon ground storage tank at Barkers Landing, and a 150,000 gallon elevated storage tank at Jonathans Landing.

Q. Describe the distribution system in Church Creek.

A. There are over 40 miles of water main and 209 fire hydrants in the Church Creek water system. Pipe material is variable, consisting of DIP, PE, HDPE, and PVC, with a range of pipe sizes from 2-inches to 16-inches.

Q. Describe the Windsong water system.

A. The Windsong water system is located in the northernmost portion of Kent County and serves the developments of Timber Mills, Windsong, Wicksfield, and Southern View. There are approximately 520 customers on this system which has three wells, three interconnections, two treatment facilities, and a storage tank. The Timber Mills facility is located in the southern portion of the system and the Windsong facility is located in the northern portion of the system near the municipality of Clayton.

Q. What is the source of supply in the Windsong system?

A. Windsong has two wells permitted by DNREC which are allocated for a total withdrawal of 648,000 gallons per day ("gpd"). There is one well permitted by DNREC at Timber Mills which is equipped with a 75 gallons per minute ("gpm") well pump.

Q. What interconnections are in the Windsong system?

A. AWC has three interconnections in the Windsong system with the municipality of Clayton, located at Route 6, Huntington Mills, and Underwoods Corner Road. Two are two-way interconnections to provide emergency supply and fire protection for AWC's

Windsong system as well as the Town of Clayton. The third interconnection provides supply and fire protection capacity to the subdivisions of Southern View and Wicksfield.

Q. What treatment is required in the Windsong system?

A. Sodium hypochlorite and a corrosion inhibitor are utilized at the Timber Mills and Windsong treatment facilities. Fluoride is added at Windsong. Granular ferric hydroxide ("GFH") media is utilized for removal of arsenic at Windsong. Back-up power is provided at Windsong.

Q. What storage is in the Windsong system?

A. A 500,000 gallon elevated tank located at Windsong provides storage for the Windsong system.

Q. Describe the distribution system in the Windsong system.

A. There are approximately 17 miles of water main and 79 fire hydrants in the Windsong water system. Pipe material is variable, consisting of DIP, HDPE and GALV, with a range of pipe sizes from 4-inches to 16-inches.

Q. Describe the individual water systems in Kent County.

A. There are four individual water systems in Kent County: Big Oak, Deer Meadows, Weatherstone Crossing, and Paradise Estates. **CTD Exhibit 9** describes each system in terms of number of customers, distribution system, number of wells, treatment required, storage on-site, and availability of back-up power.

D. <u>Sussex County</u>

Q. Describe the AWC water systems in Sussex County.

A. In 1997, AWC began providing water service to customers in Sussex County as the result of its acquisition of the developer owned and operated Cat Hill and Whites Haven Water

Companies in South Bethany. Since then, the Company has expanded its facilities to provide service to other residents of South Bethany, Fenwick Island, Middlesex Beach, Bayville Shores, Keenwick Sound, Keenwick West, and other communities along the Route 54 and Route 20 corridors including Swann Cove and the Refuge at Dirickson Creek. The Company is also serving the communities of Stonewater Creek, Independence, Heron Bay, Beaver Creek, and Holland Mills in the Rehoboth-Lewes area. AWC's Sussex County Service Territory is shown in **CTD Exhibit 2C**.

In Sussex County, the Company is dependent entirely upon groundwater for supply, which is supplied from fifteen operating wells with a total capacity of approximately 7.8 MGD. There are four storage tanks with total system storage of approximately 1.7 MG. The water distribution system consists of more than 160 miles of pipeline ranging from 2-inches to 20-inches in diameter and 797 hydrants.

AWC currently serves over 5,550 customers in Sussex County in two regional systems (Bayville/South Bethany and Heron Bay) and three stand-alone systems (Cedar Landing, Beaver Creek, and Ingram Village). Each system is described in detail below.

Q. Describe the Bayville/South Bethany water system.

A. There are approximately 4,475 customers on this system which consists of five wells, two treatment facilities, and two storage tanks. The Bayville facility is located in the southern portion of the system along Route 54 and the South Bethany facility is located in the northern portion of the system in the municipality of South Bethany.

Q. What is the source of supply in the Bayville/South Bethany system?

A. Bayville has three wells permitted by DNREC which are allocated for a peak withdrawal of 2,016,000 gpd. South Bethany has two wells permitted by DNREC which are allocated for a peak withdrawal of 2,304,000 gpd.

Q. What interconnections are in the Bayville/South Bethany system?

A. AWC has one emergency interconnection with Tidewater Utilities in the Bayville/South Bethany water system at the Sea Colony development, which in turn, has an interconnection with the Town of Bethany Beach. This interconnection existed at the time the Company acquired the Cat Hill system and is available for emergency use by either water system. Additionally, AWC and the Town of Bethany Beach have arrangements to make a hydrant-to-hydrant interconnection in the event of an emergency. These interconnections provide service among the three water systems, allowing water to be transferred among the water systems during power failures, system outages, etc.

Q. What treatment is required in the Bayville/South Bethany system?

A. Sodium hydroxide, chlorine gas, a corrosion inhibitor, and fluoride are added at the Bayville and South Bethany treatment facilities. Both facilities utilize potassium permanganate and filtration for the removal of iron and manganese. Additionally, aerators and granulated activated carbon are utilized at Bayville. Back-up power is provided at both facilities.

Q. What storage is on the Bayville/South Bethany system?

A. A 1,000,000 gallon elevated tank located at Bayville and a 500,000 gallon elevated tank located at South Bethany provide storage for the Bayville/South Bethany system.

Q. Describe the distribution system in the Bayville/South Bethany system.

A. There are over 60 miles of water main and 320 fire hydrants in Bayville/South Bethany. Pipe material is variable, consisting of DIP, HDPE, PE and PVC, with a range of pipe sizes from 2-inches to 16-inches.

Q. Describe the Heron Bay water system.

A. The Heron Bay water system serves the residential developments of Heron Bay, Stonewater, and Independence. There are approximately 685 customers on this system, which consists of five wells, two treatment facilities, and one storage tank. The Stonewater facility is located in the southern portion of the system and the Heron Bay facility is located in the northern portion of the system.

Q. What is the source of supply in the Heron Bay water system?

A. There are two wells permitted by DNREC at Heron Bay which are allocated for a total withdrawal of 2,448,000 gpd. Three wells permitted by DNREC at Stonewater Creek are allocated for a total withdrawal of 1,728,000 gpd.

Q. What treatment is required in the Heron Bay system?

A. Lime, sodium hypochlorite, and a corrosion inhibitor are added at the Heron Bay facility. Potassium chloride, sodium hypochlorite, corrosion inhibitor and ion exchange units (nitrate removal) are utilized at the Stonewater Creek facility. Back-up power is provided at both facilities.

Q. What is the storage on the Heron Bay system?

A. A 30,000 gallon clearwell is located at the Heron Bay facility. Additionally, there are two (2) 528 gallon hydropneumatic tanks at Heron Bay and two (2) 528 gallon hydropneumatic tanks at Stonewater.

Q. Describe the distribution system in the Heron Bay system.

A. There are over 16 miles of water main and 76 fire hydrants in Heron Bay. Pipe material is variable, consisting of DIP, PVC, HDPE and PE, with a range of pipe sizes from 2-inches to 16-inches.

Q. Describe the individual water systems in Sussex County.

A. There are three individual water systems in Sussex County: Beaver Creek, Cedar Landing, and Ingram Village. **CTD Exhibit 10** describes each system in terms of number of customers, distribution system, number of wells, treatment required, storage on-site, and availability of back-up power.

E. <u>Historical System Delivery</u>

Q. Historically, what has been the yearly and daily amount of water that has been pumped into the AWC systems?

A. **CTD Exhibit 11** reports, in terms of millions of gallons, the amount of water pumped into AWC's systems, which I refer to as "system delivery," annually, daily, and peak-day. In 2013, total system delivery was 7.3 billion gallons, average daily system delivery was 20.08 MGD, and peak-day system delivery was 28.99 MGD.

Q. Please describe the production from the AWC's water facilities over time.

A. The production for each of the Company's wellfields over the past ten years is set forth in **CTD Exhibit 12**. This information demonstrates that pumpage from Company-owned wellfields has increased over the past several years to the point where AWC's reliance on purchased water is now reduced to an amount marginally exceeding our contractual obligations.

Q. Describe AWC's use of these wellfields during the Test Year.

A. Monthly production for the test year, January through December 2013, from each of these wellfields is summarized in **CTD Exhibit 13**. Production for each wellfield is presented in million gallons pumped for each month. Wellfield production is then summed to produce the total self-supply.

Monthly production from each wellfield reflects AWC's practice of conjunctive use in accordance with its water-supply plan. Wells and wellfields are rested during the winter and early spring when surface water supplies are plentiful to allow water levels in those wells to recover. This allows production from the wells to be maximized during the summer when demand is high and surface water supplies may become less available.

Q. Are there constraints on pumpage of water from AWC's wells and wellfields?

A. Yes. Most of the wells and wellfields are limited in the amount of water that may be withdrawn by allocation permits issued by the DNREC. The constraints imposed by allocation permits are set forth in **CTD Exhibit 14.**

Q. Please describe the columns in CTD Exhibit 14.

A. The first column identifies each wellfield and well within the system. For each well, the second and third columns reflect the maximum amount of water (in gallons per minute and million gallons per day) that each well may withdraw at any point in time. The fourth, fifth, and sixth columns show the maximum allowable withdrawal for the wellfield for any one day, any 30-day period, and any year, respectively.

Finally, the last column shows the maximum allowable level in feet below ground surface (drawdown) to which the water level from each well can be lowered before the Company must reduce pumpage from the well.

Q. Are the wellfields pumping at their permitted rates as shown in CTD Exhibit 14?

A. Generally, the wells and wellfields are pumping at rates less than the pumping limits set forth in the allocation permits.

Q. Why is pumpage not maintained at the maximum quantities allowed by the allocation permits?

A. The wells and wellfields are limited in the amount they may withdraw for several reasons. First, well or wellfield total pumpage may not exceed permit limits. This limitation is imposed on an instantaneous, daily, monthly, and annual basis.

Second, water-level drawdown of wells may not exceed permit limits. This regulatory constraint may reduce the amount of pumpage that can be realized from a well or wellfield to less than the permitted pumpage quantities. Given that the water levels of these wells are checked on a weekly basis and that water levels can vary significantly due to small variations in pumpage or changes in precipitation, it is important that some "margin of safety" be maintained between measured drawdown levels and levels permitted by allocation permit.

Third, the Company must assure the long-term ability of wellfields to maintain pumpage. The quality of the water pumped from a well or wellfield may also necessitate reduced production. Specific constraints on individual wellfields are explained later in my testimony.

Finally, we can only pump wells to the extent that we have demand from our customers. Again, it is necessary that we purchase the minimum quantities of water not only to meet contractual obligations, but to prudently manage our self-supply. Pumpage from our wellfields is, therefore, used to make up the difference between these quantities and actual system demand.

Q. Please explain the pumpage constraints and considerations for AWC's wellfields shown in CTD Exhibit 14.

A. Those constraints are explained in **CTD Exhibit 15**.

Q. Will the Company rely on other sources of supply to meet demand over the Test Period?

A. Yes, as reflected in **CTD Exhibit 16**, AWC will supplement its self-supply by purchasing 3.19 MGD, including approximately 3.00 MGD of water from the Chester Water Authority (CWA) pursuant to a contract that requires minimum annual purchases of that amount, and approximately 0.19 MGD of water from the City of Wilmington at the Taft & Cleveland interconnection for purposes of maintaining water quality in that portion of the system.

F. <u>Projection of Customer Delivery</u>

Q. How will AWC meet total system delivery needs for the Test Period?

A. AWC's system delivery need is summarized in **CTD Exhibit 16**. As reflected in **CTD Exhibit 16**, the total system delivery in excess of self-supply is made up by slightly greater than required minimum interconnection purchases. For the twelve-month period ending September 30, 2014, total system delivery is anticipated to be 7.513 MG, with 6.347 MG supplied from the Company's wellfields (about 84% of total system delivery) and 1.166 MG supplied through interconnections (about 16% of total system delivery).

Q. What is the annual normalized pro forma system delivery need projected for the Test Period?

A. The annual pro forma system delivery projected for the Test Period is presented in **CTD Exhibit 17**. On a pro forma basis, total system delivery for the Test Period is 7.546 MG, with 6.382 MG supplied from the Company's wellfields (approximately 84% of total) and 1.164 MG supplied through interconnections approximately 16% of total).

Q. Describe AWC's use of these wellfields during the Test Year.

A. Monthly production for the test year, January through December 2013, from each of these wellfields is summarized in **CTD Exhibit 13**. Production for each wellfield is presented in million gallons pumped for each month. Wellfield production is then summed to produce the total self-supply.

Q. What is the total capacity of the New Castle County wellfields?

A. In June 2012, the Company filed a certification with the Water Supply Coordinating Council that AWC has sufficient sources of water to provide adequate supply to meet the projected demand in northern New Castle County through 2015, without relying upon out-of-state suppliers, except for minimum purchase obligations under purchase water contracts in existence on April 1, 2003. The Company's wellfields in northern New Castle County result in a self-supply capacity in 2012 of 23.73 MGD from production wells and 1.42 MGD from ASR, and a total system supply capacity of 28.85 MGD with interconnections. Given the Company's total current supply, capacity is adequate to meet customer demands through the Test Period and into the foreseeable future.

In addition, the Company's wellfields in southern New Castle County had an average delivery of 1.4 MGD in 2013 and a peak supply capacity of 6.46 MGD, which is adequate to meet customer demands through the Test Period.

Q. Please describe the anticipated use of the Kent County wellfields during the Test Period.

A. Projected wellfield production for the Kent County wellfields during the Test Period is expected to be about 178 MG, or about 0.49 MGD

Q. Please describe the anticipated use of the Sussex County wellfields during the Test Period.

A. Projected wellfield production for the Sussex County wellfields during the Test Period is expected to be about 310 MG, for an average of about 0.85 MGD with demands during the summer weekend days over 2.1 MGD.

V. NON-REVENUE GENERATING PROJECTS

Q. Is AWC requesting any recovery for capital expenditures attributable to non-revenue generating projects in this proceeding?

A. Yes. There are three primary categories of non-revenue generating projects for which the Company is requesting recovery. The first category consists of water system upgrades that are being performed to improve system water quality and supply reliability (including hydraulic improvements; new and upgraded treatment facilities; creating, redeveloping, and replacing wells; and pump replacements). AWC has invested a total of $2,033,000 in hydraulic improvements, $5,076,000 in treatment facilities, $890,000 in wells, and $339,000 in pump replacements since the end of the last rate case test period (October 1, 2011) through the end of this rate case test year (December 31, 2013). AWC plans to invest an additional $13,161,000 in this category during the test period of January 1, 2014 through September 30, 2014 The second category consists of transmission and distribution projects in conjunction with projects initiated by State or local government for road and infrastructure improvements. The Company has invested a total of $1,075,000 in this category since the end of the last rate case test period

(October 1, 2011) through the end of this rate case test year (December 31, 2013). AWC plans to invest an additional $1,024,000 in this category during the test period of January 1, 2014 through September 30, 2014. The third category consists of the replacement of mains, hydrants, and services as part of AWC's water main replacement program. Artesian will replace a leaking service under a paved road rather than making a repair which would require removal and restoration of a hard surface. The Company has invested a total of $6,978,000 in this category since the end of the last rate case test period (October 1, 2011) through the end of this rate case test year (December 31, 2013). AWC plans to invest an additional $6,389,000 in this category during the test period from January 1, 2014 through September 30, 2014. Specific cost information for the projects to be completed throughout the remainder of the Test Period is set forth in **CTD Exhibit 18.**

A. <u>Non-Revenue Generating Water System Upgrades to Improve Water Quality and System Reliability</u>

Q. Please describe the major non-revenue generating water supply upgrades since the last rate case filing in 2011 and also the planned upgrades to be completed by the end of the current test period (September 30, 2014).

A. **Glendale and Fairwinds Radium Removal.** In 2011, the radium levels in the well water at these plants exceeded the maximum contaminant level ("MCL") of 5.0 pCi/l.. AWC investigated and piloted different treatment options before selecting and installing a co-precipitation treatment option. Radium removal filters and associated appurtenances were installed at Glendale and Fairwinds at a cost of $2,060,000 and $2,099,000 respectively.

Well Replacements and Redevelopment. Wells that were installed in the 1950s and 1960s were typically constructed as Kelly wells with precast concrete segments. In 2011, one of these wells, Castle Hills #3, failed and it was determined that wells constructed in this manner have a high probability of failing after 40 years. AWC has identified all of the Kelly wells in its system and has implemented a replacement plan to replace these wells before they fail. Since the last rate case, Castle Hills Well #3 and Jefferson Farms Well #1 were replaced with higher efficiency wells. Llangollen Well G-3, Jefferson Farms Well #2, and Fairwinds Well #6 will be replaced and put into service during the test period in 2014 at an estimated cost of $819,218. Over the next five years, the Company plans to replace the remaining eight Kelly wells. In addition to replacing Kelly wells, AWC monitors the performance of its production wells to ensure they are operating at capacity. When well performance declines, AWC conducts a pump test to determine if the pump or the well is operating under capacity. If the well is identified as operating under capacity, typically from iron build-up on the casing or screen, the well is redeveloped using a combination of chemical and mechanical treatments. The Eastern States wells were redeveloped last year. The Choptank wells will be redeveloped and placed into service during the test period in 2014. The Company has invested a total of $890,000 in well replacement and redevelopment since the end of the last rate case test period (October 1, 2011) through the end of this rate case test year (December 31, 2013). AWC plans to invest an additional $1,060,000 during the test period from January 1, 2014 through September 30, 2014.

Llangollen Water Treatmant Plant ("WTP") 1,4 Dioxane Removal. The concentration of 1,4 dioxane in two of the four wells in the Llangollen wellfield has increased to a level of concern based upon Delaware's Office of Drinking Water' advisory level of 3.5 parts per billion. AWC requested a proposal from Hatch Mott McDonald, a respected consultant in this type of treatment, and investigated three Advanced Oxidation Processes for the removal of 1, 4- dioxane at the levels detected in the Llangollen Estates Wellfield based on the output for the Llangollen Water Treatment Plant of 2.2 MGD. The new treatment process AWC is installing at Llangollen is known as an ultraviolet advanced oxidation process (UV/AOP). It involves adding hydrogen peroxide (H_2O_2) to the water and then treating with UV light. The three options investigated were: (1) Trojan Low Pressure-High Output UV and Hydrogen Peroxide System; (2) Calgon Medium Pressure UV with Hydrogen Peroxide System; and (3) an Applied Technologies Ozone with Hydrogen Peroxide System. Based on the three options, the Applied Technologies Ozone with Hydrogen Peroxide System was ruled out as the plant is constructed in a residential neighborhood and Artesian wanted to minimize any risk of having an ozone facility near residents. Of the remaining two options, AWC selected the Trojan Low Pressure-High Output UV and Hydrogen Peroxide System as it has a comparable capital cost, lower life-cycle cost, and a lower annual operation and maintenance cost than the Calgon Medium Pressure UV and Hydrogen Peroxide System. The new equipment is being installed in a separate building located near the existing treatment building. The ongoing major operational expenses will be electricity, replacement bulbs for the UV reactors, hydrogen peroxide, and manpower. The total capital cost of this project is estimated at $3,902,000 and the facility is scheduled to be in service by September 30, 2014.

Route 273 to Christiana Mall. This project is approximately 4,300-feet of 16-inch ductile iron pipe and 1,200-feet of high density polyethylene. This project will improve reliability and provide a second water feed into the Christiana Mall, which is currently fed with a single 16-inch water main. The estimated cost of this project is $1,350,000, of which AWC expects a contribution of $874,026 from three new customers. The project will be complete by September 30, 2014.

Christiana Mall to Continental Drive. This project is approximately 4,300-feet of 16-inch ductile iron pipe and 700-feet of high density polyethylene. By adding the Route 273 to the Christiana Mall project, along with this project into the water distribution system, reliability will improve by providing another feed from Service Level 1 to Service Level 2. The estimated cost of this project is $1,100,000. The project will be complete by September 30, 2014.

Christiana Booster Station. The Christiana Booster station has been constructed to provide a more reliable supply of water to the Christiana Hospital, Christiana Mall Expansion Area, DelTech, JPMorgan Bank and other businesses in the area. It will provide a third crossing of I-95 to better ensure reliability in the event of a failure at one of the other I-95 crossings. This project will provide redundancy for the existing Churchmans Road Booster Station, which has been in service for over 50 years. While the Churchmans Road Booster Station can pump approximately 5.75 MGD, the recent growth in the Christiana Mall area has created concern that Churchmans Road Booster Station alone is not adequate to provide sufficient supply reliability for the projects under construction in the surrounding area. The Christiana Booster Station is designed to flow approximately 5.18 MGD with two pumps each capable of 1,800 gpm and one spare pump capable of a flow of 1,800 gpm for redundancy. The size of the booster station was established to ensure the continued flow of water in this portion of New Castle County in the event the Churchmans Road Booster Station is out of service. A redundant feed of a 16-inch main and the Christiana Booster station will provide additional water that would essentially provide a quantity of water equal to that of the Churchmans Road Booster Station. The total cost of this project is estimated at $1,878,000 and is scheduled to be in service by September 30, 2014.

Bayberry South to Commodore Estates II. This project is approximately 3,000-feet of 12-inch PVC and ductile iron pipe. This project will connect the stand-alone Commodore Estates II water distribution system to AWC's Main System south of the Canal. This project will improve water service reliability and enable fire protection to the Commodore Estates subdivision. This project is estimated to cost approximately $210,000 and will be complete by September 30, 2014.

Castle Hills Clearwell and Plant Upgrades. In October 2012, an inspection revealed that the structural concrete floor of this 1950s era facility was in poor condition. The reinforcing steel was corroding and the concrete was cracking and spalling. In order to replace the concrete floor, all of the equipment had to be removed. An analysis determined that the equipment was at the end of its useful life and was in need of replacement. The proposed plant includes a new lime slurry system, aluminum aerator, separate chemical rooms, separate electrical rooms, and new booster pumps. The station also had to undergo electrical and mechanical rehabilitations. These upgrades provide increased station safety for operators and chemical delivery personnel. This project has an estimated cost of $1,164,000 and is expected to be completed by May 2014.

Choptank Wells #2 and #3 Redevelopment. The Choptank wellfield was operating below its capacity so Engineering performed a specific capacity analysis on the existing wells and determined that Wells #2 and #3 were both in need of redevelopment and new pumping equipment. The specific capacities of the wells had dropped and the pumps were failing. The well redevelopment and pump upgrades will increase the efficiency and reliability of the station. The total cost of this project is estimated at $131,000 and is scheduled to be back in service by April 2014.

Fairwinds #6 Kelly Well Replacement. This is a Kelly well that was put into service in 1967. This Fairwinds well has exceeded its 40-year life estimate and is in need of replacement before failure. The new well will be drilled using reverse-rotary drilling, which should increase the efficiency of the well. This project is estimated to cost $200,000 and is scheduled to be in service by August 2014.

Automation and Controls. The Bayview, Midvale, and Roseville Park Booster Station facilities will be added to the corporate Supervisory Controls and Data Acquisition ("SCADA") system. The Company has standardized on SCADA instrumentation at all its water treatment facilities so they can be controlled remotely and send alarms to our dispatcher for emergency response. The SCADA software will also record and save important trending data that allows the Engineering and Operations Departments to analyze the status of the facility and distribution system so that future planning and more efficient changes can be made. The total cost of these projects is estimated at $130,000 and scheduled to be in service by July 2014.

Station Generators. Generators are being added at the Beaver Creek, Llangollen, and Augustine Creek water treatment plants. Generators will allow treatment plants to remain operational in the event of a power outage or other major natural catastrophe. Generators are sized for critical facilities to serve as back-up power for emergency response. These projects have an estimated cost of $235,000 and are expected to be in service by September 30, 2014.

B. Non-Revenue Generating Transmission and Distribution Projects Initiated by State or Local Government

Q. Please describe the major non-revenue generating transmission and distribution ("T&D") projects initiated by state or local government since the last rate case filing in 2011, as well as any planned T&D projects to be completed by the end of the current test period (September 30, 2014).

A. There were several major projects that were completed between 2011 and this rate filing. These projects include SR 7 from Newtown Road to SR 273, DRBA Airport Taxiway Expansion, US 301-MD Line to Levels Road, US 301 Armstrong Corner Road, and BR 1-366 Chesapeake City Road. These mains were located within DelDOT rights-of-way and were required to be relocated since there were conflicts with road projects. The total cost for all projects since the last rate filing was $1,075,000. Projects anticipated to be completed during the current test period are as follows:

Howell School Road, SR 896 to SR 71 Advance Utility Relocation. AWC is replacing approximately 900 feet of 16-inch and 400-feet of 12-inch ductile iron pipe with 1,800 feet of 20-inch ductile iron pipe at the intersection of Denny Road and SR 896 in Newark, Delaware. This relocation work constitutes advanced utility relocations for DelDOT's proposed Howell School Road realignment project and incorporates a larger diameter pipe that will become a critical segment of a future hydraulic improvement initiative. This phase of the project has an estimated cost of $486,000 and is anticipated to be completed by September of 2014.

US 301 Bypass, Levels Road to Summit Bridge Road. AWC is replacing approximately 1,700 feet of 12-inch ductile iron water main along Bunker Hill Road in Middletown, Delaware. This relocation work constitutes advanced utility relocations at a future bridge location on Contract 2A of the proposed US 301 Mainline Project and is 100% reimbursable by the State. The project has a total estimated cost of $377,000.00 and is anticipated to be completed by August of 2014.

C. Non-Revenue Generating Main Replacement Program

Q. Does AWC have a Main Replacement Program?

A. In an effort to avoid infrastructure problems and ensure both superior service and a reliable supply of quality water for our customers, the Company has implemented a major water main replacement program that focuses on those areas with some of the worst history of main breaks and failures. Under the program, AWC is replacing old asbestos cement (AC) pipe, galvanized steel (GALV) pipe, and unlined cast iron (CI) pipe. The main replacement program has a two-fold purpose: 1) to reduce the frequency of main breaks, thereby reducing transmission and distribution repair costs, lost water expense (unaccounted for water), and the frequency of customer outages; and 2) to improve water service, including improved water quality to our customers. Since this program commenced in 1994, AWC has seen water main breaks drop from 199 in 1993 to an average of 108 over the last five years, or by 45%. This reduction in main breaks has resulted in less water lost from the system. Unaccounted water has been, on the average, about 10 percent of production over the last 10 years. The American Water Works Association ("AWWA") recommends that utilities establish a goal of unaccounted for water of less than 10 percent. Since 1996, Artesian has replaced 104,247 linear feet of AC pipe, 61,018 linear feet of GALV pipe, and 70,300 linear feet of CI pipe.

Q. What type of material does AWC use in its water main replacement program and why?

A. Except in the severe coastal environment where exposure to the high water table, corrosive soils, and salt are not conducive to the use of iron pipe, AWC typically uses ductile iron pipe (DIP) for main replacements. This is the highest quality pipe material with a long history of successful use. The Company believes that replacement of older, inferior materials with ductile iron will continue to reduce the number of main breaks and the interruption of service and water quality problems that accompany them.

Q. Please describe the major main replacement projects since the last rate case filing in 2011, as well as any planned main replacement projects to be completed by the end of the current test period (September 30, 2014).

A. There were several major projects that were completed between 2011 and this rate filing. These projects included work at Newport Heights, Limestone Road, Linden Green, Centerville Road, Erickson Drive, Llangollen Estates, East Minquadale, Klair Estates, Old Harmony Road, Duross Heights, Meadow Road, Swanwyck Estates, and Heritage Park. The total cost for all projects since the last rate filing was $6,978,000. Main replacement projects anticipated to be completed during the current test period are as follows:

Collins Park. The Company will install 8-inch ductile iron pipe (DIP), 6-inch DIP water main, three fire hydrants, and 102 water services. This will replace 6-inch asbestos cement (AC) pipe. This project is scheduled for completion in June 2014 at an estimated cost of $786,000.

Swanwyck Estates. The Company will install 8-inch ductile iron pipe (DIP), three fire hydrants and four water services. This will replace 8-inch asbestos cement (AC) pipe. This project is scheduled for completion in April 2014 at an estimated cost of $275,000.

Brookmeade I. The Company will install 8-inch ductile iron pipe (DIP), 2-inch polyethylene (PE), two fire hydrants and 46 water services. This will replace 6-inch cast iron pipe (CI). This project is scheduled for completion in May 2014 at an estimated cost of $461,000.

Richardson Park. The Company will install 8-inch ductile iron pipe (DIP), 4-inch ductile iron pipe, four fire hydrants and 70 water services. This will replace 6-inch cast iron pipe (CI), 4-inch CI and 2-inch galvanized steel pipe (GALV). This project is scheduled for completion in June 2014 at an estimated cost of $806,000.

East Minquadale. The Company will install 8-inch ductile iron pipe (DIP), 4-inch DIP, two fire hydrants, and 40 water services. This will replace 2-inch galvanized steel pipe (GALV). This project is scheduled for completion in August 2014 at an estimated cost of $400,000.

Del Park Manor. The Company will install 8-inch ductile iron pipe (DIP), four fire hydrants and 71 water services. This will replace 8-inch asbestos cement (AC) pipe and 6-inch AC pipe. This project is scheduled for completion in August 2014 at an estimated cost of $717,000.

Bowlerama. The Company will install 8-inch ductile iron pipe (DIP), two fire hydrants, and nine water services. This will replace 8-inch cast iron pipe (CI). This project is scheduled for completion in August 2014 at an estimated cost of $435,000.

Newport Gap Pike. The Company will install 8-inch ductile iron pipe (DIP), 2-inch polyethylene (PE), two fire hydrants, and 22 water services. This will replace 8-inch cast iron pipe (CI), 8-inch asbestos cement (AC) pipe, and 2-inch galvanized steel pipe (GALV). This project is scheduled for completion in August 2014 at an estimated cost of $337,000.

Vilone Village. The Company will install 8-inch ductile iron pipe (DIP), 6-inch DIP, 4-inch DIP, 2-inch polyethylene (PE), six fire hydrants, and 102 water services. This will replace 8-inch asbestos cement (AC) pipe, 6-inch AC pipe, and 2-inch galvanized pipe (GALV). This project is scheduled for completion in February 2014 at an estimated cost of $899,000.

Manette Heights. The Company will clean and line 3,000 linear feet of 6-inch and 4-inch cast iron (CI) pipe. The process will clean the existing CI pipe and line it with a layer of cement. Lining the water mains was chosen over replacement because there is no break history in this development. Cleaning and lining water main is only used when there is a water quality issue. The quality issue causes high iron in the water mains, which require frequent trips for our Water Quality Technician to rectify the problem. The project is scheduled for completion by August 2014 at an estimated cost of $225,000.

Sheffield Manor Bridge Crossing Renewal. The Company will install 12-inch high density polyethylene pipe (HDPE) to replace approximately 160 linear feet of 6-inch steel water main that is currently hanging on the bridge between Creekside and Sheffield

Manor. The project is scheduled for completion by August 2014 at an estimated cost of $200,000.

VI. REVENUE GENERATING PROJECTS

Q. Please describe the major expenditures included in the Company's filing for revenue generating projects.

A. **Ingram Village Well and Interim Treatment Plant**. Ingram Village is a 400-lot subdivision located along the northern boundary of the Town of Ellendale, Delaware. The first two homes were provided water service using a residential well. An interim facility consisting of a treatment shed to add sodium hydroxide, sodium hypochlorite, and a corrosion inhibitor will be constructed. The source of supply is an 8-inch production well with a 95 gpm well pump. Storage will be provided with one (1) 5,000 gallon hydropneumatic tank. This project is expected to be online in March 2014 at an estimated cost of $212,000.

Q. Does this conclude your testimony at this time?

A. Yes, it does.